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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/749,602	12/31/2003	Daryll A. Emery	293.00010102	8548

26813 7590 11/15/2006

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EXAMINER	
LEITH, PATRICIA A	

ART UNIT	PAPER NUMBER
1655	

DATE MAILED: 11/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/749,602	EMERY ET AL.	
	Examiner	Art Unit	
	Patricia Leith	1655	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *8/24/06*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *34-84* is/are pending in the application.

4a) Of the above claim(s) *45-66 and 70* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *34-44,67-69 and 71-84* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claims 34-84 are pending in the application.

Claims 45-66 and 70-82 were withdrawn from consideration on the merits as being directed toward a non-elected invention. Applicant argues that claims 71-82 should have been re-joined with claim 69 since claims 71-82 were amended to be dependant upon claim 69 (p. 10, Remarks). The Examiner concedes; the amendments to claims 71-82 to depend upon claim 69 were inadvertently overlooked. Therefore, claims 71-82 are re-joined for examination on the merits as they are directed toward an elected invention. Although these claims contain similar subject matter to claims 67-68 and 35-44 and although claims 67-68 and 35-44 were considered on the merits, in all fairness to the Applicant, this Office Action is rendered non-final.

Claims 34-44, 67-69 and 71-84 were examined on their merits.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11

F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 34-44 and 67-69 remain rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-14 of U.S. Patent No. US 6,682,754. Although the conflicting claims are not identical, they are not patentably distinct from each other because the Instant claims are made obvious by claims 1-14 of '754.

Claims 1-14 of '754 teach a method for inducing immunity in a bird via implantation in ovo of a biocompatible implant providing for delayed and sustained release of an immunogen, wherein the implant is injected during the fourth quarter of incubation, during 15-28 days of incubation and day 17-19 of incubation of an egg and wherein the implant provides for sustained release of the immunogen for about 1-90 days or 1-60 days or 1-35 days post-hatching.

The claims of 1-14 do not specifically teach wherein the immunogen is a siderophore receptor such as enterochelin. However, the patent teaches that a preferred immunogen is enterochelin (see col. 10 line 45). Therefore, enterochelin is encompassed by the term 'immunogen'.

This rejection remains pending because Applicant has neither convincingly traversed this rejection, nor has applicant furnished any terminal disclaimer in order to overcome this rejection.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 34, 37, 39-43, 67-69, 83 and 84 are rejected under 35 U.S.C. 103(a) as being unpatentable over Emery et al. (US 5,830,479) in view of Phelps et al. (US 5, 339,766) in view of Genovese et al. (1998) in light of Sharma et al. (US 4458630 A)*.

Claims 34-44, 67-69 and 71-84 are rejected under 35 U.S.C. 103(a) as being unpatentable over Emery et al. (US 5,830,479) in view of Phelps et al. (US 5, 339,766) and further in view of Evans et al. (US 6,500,438 B2) in view of Genovese et al. (1998) in light of Sharma et al. (US 4458630 A)*.

It is noted that claims 73, 74, 76 and 80 are directed toward substantially similar subject matter as claims 35, 36, 38 and 44 and are therefore rejected for

the same reasoning as set forth previously for claims 35, 36, 38 and 44. Further, Applicant argues that claims 34, 37 and 39-43 were newly rejected in the previous rejection, while the Examiner stated that the claims 'remained rejected'. The Examiner concedes; this was an inadvertent error. The rejection should have properly stated that 'claims 34, 37 and 39-43 are newly rejected'.

Applicant's arguments were fully considered, but not deemed persuasive.

Applicant argues that the Examiner does not make a *prima facie* case of obviousness because the combined references do not suggest all of the claim limitations such as 'for sustained release of the immunogen at least until the bird is capable of mounting an immune response to the immunogen or 'for sustained release of the immunogen until a time when maternal antibodies of the bird to the immunogen are sufficiently reduced so that the bird is capable of mounting an immune response to the immunogen' (p. 13, Remarks).

Applicant subsequently summarizes the teachings of each individual reference and states that:

> It is the applicants' position that Genovese et al. does not teach or suggest that 'the most crucial time of vaccination delivery to a young bird is within the first few days of life'...Genovese et al. state vaccines can be used on newly hatched chicks and poults, but 'maternal antibodies may cause interference with the vaccine and the desired

> immune response'...Genoves et al. also states that '[o]ne to 7-day-old chicks and poults have been shown to be immunologically incompetent....Thus, delivery of vaccine to a young bird within the first few days of life is not recognized to be a crucial time for vaccination, as the effect of vaccination at this time is suppressed by the presence of the maternal antibodies, and the bird's immune system is incompetent (p. 15, Remarks)

First, it is believed that Genovese et al. clearly teaches that immunization within the first few days of hatching is beneficial because, to reiterate, Genovese et al. states "...it would be advantageous to administer an agent which could potentiate an immediate immune response for protection during the 4 to 7 days when the birds are most susceptible to these bacterial invaders and vaccination responses have not yet taken full effect". Genovese et al. further state in the same paragraph that "poultry have been shown to be most susceptible to bacterial species such as Salmonella during the first 4 days of life". Further, Genovese et al. state that "vaccinations currently used on newly hatched chicks and poults ***do provide some levels of protection***"(emphasis added). It is true that the chick's immune systems at this young age are 'incompetent'; however, it is clear from Genovese et al. that newly hatched birds do elicit an immune response when challenged with vaccines. Claim 34 states 'provides for sustained release of the immunogen until the bird is capable of mounting an immune response'. It is deemed that the bird is capable of mounting an immune response to a sideropore receptor within the first few days of hatching, even if the immune response is minor; as evidenced by Genovese et al. As indicated in previous Office Actions, a booster

vaccination would be obvious to give after the initial challenge because boosters are well-known methods of increasing *in-vivo* antibody titers as clearly disclosed by Emery et al..

Thus, Emery et al. taught a biocompatible implant comprising a siderophore receptor protein from a gram-negative bacteria along with sustained-release matrices and *in-ovo* administration of the implant to a bird to elicit an immune response. Emery et al. specifically reference a patent by Kent which teaches sustained delivery systems. Emery et al. further taught immunization of birds at 3 weeks (see Example 3) which elicited an immune response. Three weeks is 21 days which satisfies the limitations of claims 39 – 41. Although Emery et al. did not specifically teach wherein the siderophore receptor was delivered *in-ovo* and formulated for 'sustained release of the immunogen until the bird is capable of mounting an immune response'; the ordinary artisan would have been motivated to use the knowledge provided by Emery et al. to provide an implant containing a siderophore receptor from a gram-negative bacteria with the sustained-release matrices explicitly taught by Emery et al. in order to provide sustained release until a time when the bird could illicit an immune response (e.g., 21 days post-hatching) in order to effectively immunize the bird. One of ordinary skill would have recognized that administration of the vaccine to the bird must have occurred at a time when the bird could illicit a response to the vaccine; or else the vaccination process would have been a failure. Thus, again, although the immune system of birds are incompetent in the first few days within hatching, it is clear that they do elicit some

response and that is why birds are vaccinated in the early days after hatching (as per Genovese et al.) or even at 3 weeks post-hatching (as per Emery et al.).

Further, as evidenced by Sharma et al. (US 4458630 A), ***a birds' immune response is elicited even in the embryonic stage when vaccinated in-ovo*** (see, for example, col. 2 lines 9-13). Although Applicants state that the Specification indicates that "conventional vaccination programs are designed to be administered after the decline of maternal antibody" as argued by Applicant (pp. 15-16, Remarks), it is clear from the art that chickens are routinely vaccinated *in-ovo* where an immune response is satisfactorily elicited. Further, again, it is clear from Emery et al. that poultry is routinely given vaccines containing siderophore receptors from gram-negative bacteria at 3 weeks post-hatch which is 21 days post-hatch.

Applicants argue that the prior art does not teach sustained release until a bird is capable of mounting an immune response or wherein maternal antibodies of the bird to the immunogen are sufficiently reduced so that the bird is capable of mounting an immune response to the immunogen (Remarks p. 16); however, it is deemed that the phrase 'sustained release' is very broad. It can mean that the immunogen is sustained for seconds after injection. Emery et al. clearly provided motivation for *in-ovo* inoculation of birds with siderophore receptors from gram-negative bacteria. Emery et specifically showed examples where birds were vaccinated at 3 weeks post-hatch with

the siderophore receptors. Emery et al. further clearly suggested the use of sustained delivery of the siderophore receptors. Although Phelps et al. was directed mainly toward improved methods for *in-ovo* injection technique of birds, the patent is considered well within the state of the art pertaining to the Instantly claimed invention. Phelps et al. clearly taught that vaccines were suitably injected into avian eggs at any time during embryonic development. Although Emery et al. did not teach *in-ovo* inoculation with a sustained-release delivery system which sustained delivery until a time of post-hatching, one of ordinary skill in the art, in light of the combined teachings of the references would have had a reasonable expectation that 1) *in-ovo* inoculation *itself* would have elicited an immune response in the embryo of the bird and 2) that sustained delivery of a siderophore receptor from a gram-negative bacterium until 21 days post-hatch would have also elicited a positive immune response in the bird because Emery et al. clearly taught immunization at day 21 of post-hatch with positive immune responses. Because Emery et al. also suggested sustained release formulations in combination with the siderophore receptor, the ordinary artisan would have been motivated to combine a siderophore receptor with sustained release carriers in order to provide an immune response in a bird *in-ovo* or after hatching. Further, because an immune response would have been elicited, it is deemed that the maternal antibodies must have been sufficiently lowered: Claim 69 states 'so that the bird is capable of mounting an immune response to the immunogen'. Since vaccines delivered *in-ovo* elicit an immune response to the embryo, the maternal antibodies must have been 'sufficiently reduced'. Here, there is no specific time claimed or disclosed for

'sufficiently reduced' – does Applicant intend for this to mean a specific time? Due to the meaning given to 'lowered maternal antibodies' in the bird as meaning that the bird is 'capable of mounting an immune response', it is deemed again that the maternal antibodies must have been lowered from some amount in order for the birds to elicit a response. In either instance, it is deemed that claims 77-79 for example indicate that this 'time' is between 1-90 days post-hatch. Because Emery et al. clearly taught immunization at 21 days, and because 21 days is within the range specified by the claims, the claims are made obvious by Emery et al.

Applicant argues that the Examiner did not respond to all of the arguments pertaining to the rejection of Emery et al. in view of Phelps et al. in view of Evans et al. in the previous Office Action. Applicant argues that Evans are directed toward administration of another type of vaccine: "Live organisms provide a very different immune challenge compared with that provided by delayed and/or sustained release of siderophore receptor protein from an implant, and are of little value in predicting protocols that will be suitable for the siderophore receptor protein immunogens of the present invention" (page 16, Remarks of 12/28/06). However, it is noted that there are no unexpected results found in the Instant specification which would indicate that the administration methods of the claims were superior over what was already known in the art. Again, the administration times as indicated by the claims are considered result-effective variables in that it was known in the art to immunize birds at different stages of embryonic development as well as post-hatching; especially lacking unexpected results.

Applicant argues that Evans et al. did not support the assertion by the examiner that it "would have been effective during any time of incubation': Applicant argues that "Column 2, lines 1-6 describes in ovo administration only during the final quarter of incubation. Example 1 describes injection only on day 18 of the incubation of chicken eggs. Column 3, lines 25-27 which refers to any time during incubation refers to administration of an immune stimulant at any time, not administration of the vaccinating sporozoites or merozoites". However, Evans et al. teaches *in-ovo* administration of the vaccines at 15-20 days *in-ovo* for chickens and 21-26 days *in-ovo* for turkeys (see Evans et al., col. 3 lines 36-43). Therefore, days 15-26 are within the final quarter (fourth quarter) of egg incubation.

Applicant argues that the Examiner asserts that "it would have been obvious to one of ordinary skill in the art ... to determine all operable and optimal concentration of components.....and optimized in the pharmaceutical art" and in response Applicant argues that "...the additional limitations provided by claims 35, 36, 38 and 44 do not relate to concentration, and immunization is a medical art, but not a pharmaceutical art, as vaccines are not drugs" and therefore states that this assertion is not pertinent (p. 16, Remarks of 12/28/06).

Although it is true that a vaccine is not a drug, and that the claims are not directed toward concentration, the rejection also indicated that :

Although the prior art do not teach all the various permutations of injection times/release times, it would be conventional and within the skill of the art to identify the optional administration times as well as release times because (1) it was well known in the art that newborn mammals have weakened immune systems, (2) *in-ovo* administration of enterochelin to challenge the immune systems of incubating poultry embryos was clearly suggested by Emery et al. and arginine [*sic*] and (3) sustained delivery systems for vaccines; i.e., biocompatible polymer coatings/matrices were known and suggested for in-ovo delivery of vaccines.

Here, it is clear that the optimization of vaccination times was well within the purview of the ordinary artisan. It has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 220 F2d 454,456,105 USPQ 233; 235 (CCPA 1955). see MPEP § 2144.05 part II A. Again, no unexpected results are observed with the method of the claimed invention. The prior art already taught that siderophore receptors were known to be administered to poultry *in-ovo* to elicit an immune response. It is deemed, again, that 'sustained' is very broad and can mean that the immunogen is 'sustained' for seconds after delivery to an embryo, where an immune response will be elicited and wherein the maternal antibodies must have been 'sufficiently reduced' in order for an immune response to take place. Alternatively, it is clear from Emery et al. that poultry is routinely vaccinated at 21 days post-hatch. Applicant indicates that this is

within the 'time' when maternal antibodies are 'sufficiently reduced' so that the bird will elicit an immune response. One of ordinary skill in the art then, would have been motivated to create a sustained-delivery system to administer in-ovo and sustain delivery until 21 days post-hatching because Emery et al. clearly taught that administration of the siderophore receptor at 21 days post-hatch elicited an immune response.

Applicant argues that "impermissible hindsight must be avoided and the legal conclusion must be reached on the basis of the facts gleaned from the prior art' (p. 17, remarks of 12/28/05. Again, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 220 F2d 454,456,105 USPQ 233; 235 (CCPA 1955). see MPEP § 2144.05 part II A. It is deemed that from the combined teachings of the prior art, coupled with reasoning that indicates that it would have been obvious to inject implants with a known siderophore in order to elicit an immune response in bird at any time during its development would have been well within the purview of the ordinary artisan at the time the invention was made because one would have expected an immune response from injection of the siderophore receptor at any time during the bird's development; especially absent any unexpected results. This is clear since it is taught by the prior art that an immune response is elicited 1) in the embryo upon inoculation, 2) in the early days post-hatch (even though it may be a slight immune response, the claims do not indicate any degree of response) and 3) about 21 days post-hatch inoculation.

Applicant argues that "While Emery et al. briefly suggests egg inoculation, it does not suggest , or provide a motivation to provide sustained release as recited in claims 34, 69, or 84 of the immunogen at least until the bird is capable of mounting an immune response to the immunogen, bur rather merely suggests that the vaccine may be administered to eggs" (p. 17, Remarks of 12/28/05). Applicant additionally argues that Phelps et al. does not provide motivation of the immunogen at least until the bird is capable of mounting an immune response to the immunogen or until a time when maternal antibodies of the bird to the immunogen are sufficiently reduced; however, keenly discussed previously, the term 'sustained' is very broad and can be directed toward merely seconds or minutes, and it is deemed that because Emery et al. taught *in-ovo* inoculation, and because it is known that *in-ovo* inoculation incurs an immune response in birds, that the maternal antibodies must have been reduced enough because an immune response would have been established. Further, it is clear from the prior art that siderophore receptors from gram-negative bacteria were known to be administered to poultry to elicit an immune response in order to build the immunity of those poultry to fight siderophores produced by gram-negative bacteria. The prior art further specifically suggested the sustained delivery of these vaccines, and suggested the use of sustained delivery devices and further specifically disclosed vaccination of birds at 21 days post-hatch. It is true that Emery et al. did not explicitly disclose every possible injection time or release time of the vaccine. However, it was clear from

Phelps et al., Genovese et al. and Evans et al. that the particulars as found in the dependant claims would have been obvious to one of ordinary skill in the art.

From the teachings of the references, it is apparent that one of ordinary skill in the art would have had a reasonable expectation of success in producing the claimed invention. Therefore, the invention as a whole was *prima facie* obvious to one of ordinary skill in the art at the time the invention was made, as evidenced by the references, especially lacking any unexpected results.

No Claims are allowed.

*this reference is cited merely to relay in intrinsic property and is not used in the basis for rejection *per se*.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patricia Leith whose telephone number is (571) 272-0968. The examiner can normally be reached on Monday - Friday 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Terry McKelvey can be reached on (571) 272-0775. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Patricia Leith
Primary Examiner
Art Unit 1655

November 9, 2006